Decomposable Container having a Multiple-part Cover

BACKGROUND OF THE INVENTION

1. Technical Field.

The invention relates to a decomposable container having a multiple-part cover.

2. Description of the Related Art.

In logistics, containers are increasingly in demand which, having been unloaded following use as a transport or storage container for unit goods or particulate goods, allow a space-saving tare transport or space-saving container storage. Decomposable containers which, once decomposed, can be compacted in a space-saving way comprise a base, a cover and supporting parts connecting the base to the cover which are detachably connected to each other to form the container and, once they have fulfilled the respective transport or storage function, can be detached from each other again by simple handling and, once detached, compacted such that the empty container can be transported and/or stored in a space-saving way. The components of the container are correspondingly provided with functional elements in order to be able to assemble the components in the container and, when decomposed, compact them into a handy package and stack them as applicable. Typical functional elements include connecting elements which serve to connect the components of the container to each other to form the container. The same functional elements or additional functional elements can also include positioning elements which serve to position the individual components of the decomposed container when compacted, and/or multiple containers stacked one on top of the other as applicable, on each other. The components of the container are mostly cost-

effectively made of plastic. The bases and covers of such containers in particular can be injection molded parts, since injection molding allows the areas necessary for the bases and covers to be molded at the same time as molding the required functional elements. If, however, the containers are to be provided in different sizes, then molding tools in the required sizes have to be provided for forming the bases and covers of different sizes. Molding tools for injection molding or other suitable methods of original molding, however, cause significant investment costs which become increasingly significant with the number of tools supplied.

With regard to the bases of containers, other methods more cost-effective than injection molding alone are already employed. Thus, for example, DE 202 05 412 U1 describes a container base made of foot elements produced by injection molding and extruded plastic pipes connecting the foot elements to each other.

SUMMARY OF THE INVENTION

It is an object of the invention to also propose a cost-effective solution for retaining the variability in size of container covers.

The invention relates to a decomposable container comprising a base, a cover and supporting parts which extend between the base and the cover and space the cover from the base. The base, cover and supporting parts at least substantially form the container when connected, and define its volume.

In accordance with the invention, the cover comprises a plate or shell structure which shall be referred to in the following as a cover area structure, and a number of edge parts which are each provided with at least one jointing element. The edge parts are distributed on the edge of the cover area structure and arranged overlapping the cover area structure. They are fixed on the cover area structure by means of their respective at least one jointing element in such a way that they each assume a defined position. Each of the edge parts comprises at least one functional element respectively. The at least one

functional element is a connecting element which serves to connect the cover to the base and the supporting parts, or a positioning element which serves to position the base and the cover, when stacked one on top of the other, on each other and/or to position the cover, when the container is assembled, on or on top of the supporting parts. Positioning prevents the cover from slipping, at least in a direction relative to the other or the number of other components of the container with which the positioning element of the cover cooperates, in order to fulfil the function of positioning. In its embodiment as a positioning element, the functional element can simultaneously be the jointing element.

In preferred embodiments, the edge parts are simply arranged lying on an outer surface of the cover when the container is assembled. In such embodiments, they correspondingly each comprise an upper part lying on the cover. The at least one jointing element for positioning the edge part in question on the cover area structure projects at an angle from the upper part and forms a stopper element which abuts the edge of the cover area structure when the edge part in question is positioned and in this way positions the edge part in question on the cover area structure. The at least one jointing element can for example be a simple pin. Preferably, the at least one jointing element comprises an extension, measured along the edge of the cover area structure, which is sufficient to prevent a rotational movement of the upper part over the surface of the cover area structure when the edge part in question is positioned, i.e. when the at least one jointing element abuts the edge of the cover area structure.

In a particularly preferred embodiment, each of the edge parts comprises at least two, preferably exactly two, jointing elements, for each of which what has been said above with respect to the at least one jointing element applies. The at least two jointing elements can in particular enclose, together with the upper part, a spatial inner angle in which a corner region of the cover area structure, abutting the upper part and the at least two jointing elements, is accommodated.

If the at least one functioning element is a connecting element, it preferably forms a tensing element to which a tensing means of the container is fastened, for example a

lashing strap. The tensing means is fastened to the connecting element and to the base or to one of the supporting parts and tenses the cover over one or more of the supporting parts, preferably against the base or simply against said one of the supporting parts.

If the at least one functioning element is a positioning element of the cover, it can in particular be a plug-in element for a plug-in connection to a counter element of the base or can just simply form a centering element to position the base on the cover for stacking on and/or under the cover.

The at least one functioning element can simultaneously form a connecting element and a positioning element in the sense described. Preferably, however, it only takes on one of the two functions. Even more preferably, each of the edge parts is provided with at least two functional elements each, one of which is the connecting element and the other the positioning element.

The edge parts are preferably plastic parts and can in particular be injection molded parts.

By forming the cover from a cover area structure, preferably from a one-piece cover area structure, and a number of edge parts which fulfil at least one particular function by means of their at least one functional element each, the cover area structure can be produced particularly simply and therefore cheaply. It can in particular be continuously molded in a strand, preferably extruded or laminated. Once molded in a strand, the plate or shell structure thus obtained merely has to be tailored to the size desired for the cover, which can be achieved using simple and therefore cheap separating methods, for example by cutting, sawing or nipping. A further stage of finishing can be that of bending, by which beveling is also meant. The cover area structure advantageously does not require any further machining beyond the machining steps cited, except for fine-machining to be performed as applicable, such as for example grinding, smoothing and the like. Drilling and milling are in particular not necessary for the cover area structure tailored to size and subjected to subsequent bending as applicable. On the other hand,

the possibility is not to be excluded that simple drilling and milling is and/or was performed on the finished cover area structure.

The invention is particularly advantageous when covers of different sizes are necessary for containers of different sizes. The edge parts, which are preferably produced by plastic injection molding, can be the same for each of the overall cover sizes. In order to vary the size of the cover, it is merely necessary to provide cover area structures of different sizes.

The cover area structure is preferably a multiple-bridge plate comprising at least two covering layers and supporting bridges connecting the covering layers to each other. The covering layers and the supporting bridges preferably form a latticework in the cross-section of the cover area structure. Preferred multiple-bridge plates are for example described in DE 102 12 401, to which reference is made in this respect. Another preferred multiple-bridge plate is the Con Pearl® plate belonging to the Applicant.

For retaining variability, the base can advantageously be formed as described in DE 100 48 135 A1 and DE 202 05 412 U2 and in US 10/162,971. The same applies with regard to the supporting parts which can in particular be formed by columns or by incorporating columns. Reference is hereby made to the cited documents with regard to the base and supporting parts.

The base can advantageously be supplemented by a base area structure which is simply laid onto connecting pipes or rods between foot elements of the base, said pipes or rods connecting the foot elements to each other with respect to the respective base. With regard to the materials and manner of production, the base area structure can be formed like the cover area structure.

The invention also relates to a method for producing a decomposable container comprising a base, a cover and supporting parts which space the cover and the base from each other when the container is assembled. To form the container, the base and

the supporting parts are produced separately. For producing the cover, a half-finished plate or shell is molded in a strand, preferably extruded or laminated. The half-finished plate or shell is then tailored to a particular end size necessary for the cover, i.e. acquires said end size, by means of a suitable separating method, for example by cutting, sawing or nipping. The structure thus obtained can already form the cover area structure. Bevels or curves are formed by means of forming under bending conditions as applicable, in a procedure following tailoring. Aside from purely finishing procedures, such as for example grinding, cleaning and the like, further machining is preferably not performed on the cover area structure. Furthermore, the edge parts are molded together with the at least one functional element in each case in a pressing or casting method, preferably by injection molding. The cover area structure and the edge parts are connected to each other by means of jointing connections, such that the cover is obtained. Lastly, the base, the supporting parts and the cover are connected to each other, preferably by means of tensing means.

Other preferred embodiments are also described in the sub-claims and combinations of the sub-claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Example embodiments of the invention will now be explained by way of figures. Features disclosed by the example embodiments, each individually and in any combination of features, advantageously develops the subjects of the claims and the embodiments described above. There is shown:

Figure 1 a first example embodiment of a container in accordance with the invention;

Figure 2 a second example embodiment of a container in accordance with the invention;

Figure 3 a third example embodiment of a container in accordance with the invention;

Figure 4 the container of the third example embodiment, compacted;

Figure 5 a part of a container base and a number of edge parts for a container cover;

Figure 6 a cover area structure and a base area structure;

Figure 7 a base and a cover; and

Figure 8 a modified base and a modified cover.

DETAILED DESCRIPTION

Figure 1 shows a container for individually transporting or jointly transporting large unit goods. Such a unit good, transported individually or in smaller units, can in particular be a bicycle, preferably a motorcycle. The container comprises a base 1, a cover 10 and columnar supporting parts 9. The base 1, the cover 10 and the columnar supporting parts 9 surround a container volume in which the individual unit good or number of unit goods can be accommodated. The supporting parts 9 rise up perpendicularly from a surface of the base 1 facing the cover 10 and support the cover 10. The base 1 and the cover 10 are each assembled from multiple parts made of a small number of different types of plastic parts.

The composition of the base 1 and the cover 10 may be seen from an overview of Figures 5, 6 and 7.

The base 1 consists of four foot elements 2, a number of connecting pipes 4 and a base area structure 6. The foot elements 2 form the corner regions of the base 1 and are respectively connected to each other in pairs by means of the connecting pipes 4, such that rigid base structure is created. The base area structure 6 is a cruciform plate which is dimensioned such that it fills in the free area between the foot elements 2 and a closed base area is obtained. It simply lies on the connecting pipes 4 between the foot elements 2. Each of the foot elements 2 forms free-standing feet 3 which on the one hand improves the stability of the container and on the other creates space in particular below the container, into which for example the forks of a forklift truck can be inserted or in

which another carrying means can engage. The connecting pipes 4 are plugged into appropriately shaped receptacles in the foot elements 2 and are held in a frictional lock in said receptacles. In addition, they can be screwed to the foot elements 2 or preferably connected in a material lock, for example welded. The foot elements 2 further form one-piece connecting elements 5 for connecting to the supporting parts 9. The connecting elements 5 rise up perpendicularly from the surface of the foot elements 2 towards the cover 10 and are shaped to fit the hollow cross-section of the supporting parts 9, preferably such that each one of the supporting parts 9 can be plugged onto one of the connecting elements 5.

The foot elements 2 are plastic injection molded parts. The base area structure 6 is a multiple-bridge plate, i.e. a stabile hollow-chamber lightweight plate. Extruded, one-piece plastic pipes form the supporting parts 9.

The cover 10 consists of a rectangular cover area structure 17 and four edge parts 11 which lie in the corner regions of the cover area structure 17 on its surface facing away from the base 1 and abut the edge areas of the cover area structure 17 which converge in the respective corners. The connection between the cover area structure 17 and the edge parts 11 is a positive lock and to a lesser extent a frictional lock, such that before the container is assembled, the edge parts 11 lie loosely on the cover area structure 17 with a slight frictional lock force and abut and grip its edges. The can be simply removed from the cover area structure by hand, without tools.

The edge parts 11 are identical to each other. They each consist of an upper part 12, two jointing elements 13 and a number of connecting elements 14 and positioning elements 15, in the example embodiment two connecting elements 14 and two positioning elements 15. The upper part 12 exhibits a lower side which is adapted to the surface of the cover area structure 17. Since the cover area structure 17 of the example embodiment is a plate structure, the lower side of the upper part 12 is correspondingly plane. In the example embodiment, the upper part 12 is likewise plate-like and comprises an opening which reduces the weight. The jointing elements 13 project

perpendicularly from the lower side of the upper part 12. In the example embodiment, the jointing elements 13 are edge angles of the respective upper part 12 and extend over the entire length of the respective edge of the upper part 12. In this way, a spatial square angle is obtained, adapted to the shape of the corner regions 18 of the cover area structure 17, in which angle each one of the corner regions 18 of the cover area structure 17 is accommodated, tightly framed on three sides.

The connecting elements 14 each form a first functional element of the edge parts 11. The connecting elements 14 are identical to each other. They are shaped such that a tensing means, for example a lashing strap, can be fastened to each of them, such that the cover 10 is tensed towards the base 1 via the supporting parts 9 by means of the tensing means fastened to the connecting elements 14 and the container is thereby held together. The connecting element 14 can in particular be a hook or more preferably an eye for fastening the tensing means. The connecting elements 14 are each formed in a recess of the edge parts 11, such that tensing means fastened to each connecting element 14 does not protrude beyond the edge part in question.

The positioning elements 15 serve for positioning and fixing and thus for centering another base 1 on the cover 10. Positioning and fixing is helpful when a number of assembled or compacted containers are stacked one on top of the other, wherein merely for the sake of completeness it may also be mentioned that assembled and compacted containers can be stacked one on top of the other in any order. The positioning elements 15 are appendices which rise up from the upper parts 12 on their upper sides. If a base 1 is placed onto the cover 10, the positioning elements 15 are accommodated in the hollow feet 3 of the foot elements 2. In this way, the positioning elements 15 prevent a base 1 placed onto the cover 10 from being able to slip off of the cover 10. The feet 3 form the positioning counter elements which cooperate with the positioning elements 15 for this purpose.

The edge parts 11 are plastic injection molded parts, molded as one piece.

The cover area structure 17 is a plate structure made of an extruded or laminated half-finished plastic product. In order to obtain as high a bending resistance and buckling resistance as possible, it is a double-bridge plate comprising two covering layers and supporting bridges arranged in between, connecting the covering layers. In the case of an extrudate, the supporting bridges are linear bridges extending in the extruding direction of the half-finished product, and preferably forming a latticework with the covering layers. In the case of a laminate, the supporting bridges are preferably supporting cups.

As may be seen in Figure 6 in particular, the cover area structure 17 deviates from a simple, thin rectangular plate only in that it comprises an elongated bevel 19 on each of its linear edges which extends as far as the adjacent, simply plane corner regions 18. Once the edge parts 11 have been pushed or placed on, the corner regions 18 are completely accommodated in the inner angular region of the respective edge part 11. The jointing elements 13 are as wide as the bevels 19 and extend the latter into the corners of the cover 10. By means of the bevels 19 and the jointing elements 13, the cover 10 is obtained as a flat box, wherein the flat, circumferentially closed side walls of said box, namely the bevels 19 and the jointing elements 13, point towards the base 1 when the container is assembled. The supporting parts 9 abut obtusely against the lower side of the cover 10, i.e. against the lower side of the cover area structure 17, and are laterally supported on the jointing elements 13 and/or bevels 19. This support on one side, on two side in the corner regions of the cover 10, in conjunction with the tensile force of the tensing means which tense the cover 10 against the base 1 and in combination with the plug-in connection between the supporting parts 9 and the connecting elements 5, would in principle already be sufficient to stabilize the supporting parts 9 with respect to their orientation. The jointing elements 13 would thus simultaneously also be positioning elements of the cover 10. In accordance with preferred embodiments, however, each of the edge parts 11 comprises connecting elements corresponding to the connecting elements 5 of the foot elements, said connecting elements of the edge parts 11 each projecting from the lower side of the edge parts 11 towards the connecting elements 5. In such preferred embodiments of the edge

parts 11, the columns 9 are thus also positioned on the cover 10 in a positive lock and preferably in a positive and frictional lock.

Constructing the cover 10 from a cover area structure 17 and a number of edge parts 11 enables the cover 10 to be produced cheaply. The advantage in costs becomes particularly significant when covers 10 have to be produced in different sizes, for forming containers having different base areas. The cover area structure 17 substantially takes on only the two tasks that it bridges the required base area and serves as a support structure for the edge parts 11. The edge parts 11, which in particular create the fastening points for the tensing means, take on the other functions. Dividing up the functions enables the cover area structure 17 to be adapted to different base areas cheaply, while the edge parts 11 can be produced in a constantly identical shape and size, by injection molding or another method of original molding which allows molding as one piece.

For producing the cover area structure 17, a simple half-finished plate or preferably a hollow-chamber half-finished plate is extruded or laminated in a strand. The half-finished product can advantageously be the same for all established sizes. As applicable, the width of the strand is set in accordance with the desired size. In a following step, the half-finished product provided in the strand is tailored to the required size by means of a suitable separating method, for example by cutting. If the width of the strand has already been set to the desired size, then it is sufficient to cut the strand to length, in order to obtain the cover area structure 17 in its overall measured, i.e. largest, length and width. Using a subsequent separating method, the corner regions 18 and the regions, still protruding plane, for the later bevels 19 are formed. The cover area structure 17 is thus tailored to the required size. In a following operational step, the bevels 19 are created by means of forming under bending conditions. Aside from any fine-machining, such as for example edge-grinding and cleaning the cover area structure 17, the finished cover area structure 17 is then already provided. It is possible to simply and therefore cheaply vary the size of the cover area structure 17.

The edge parts 11 are placed or pushed onto the cover area structure 17 thus obtained, until they snugly abut the edges of the corner regions 18 and the corner regions 18 are accommodated in the inner angular regions of the edge parts 11, forming a slight frictional lock. It should also be noted with respect to the cover area structure 17 that the edges of its corner regions 18 always exhibit the same length, since in particular the upper part 12 and the jointing elements 13 of the edge parts 11 always have the same shape and size.

It should also be noted with respect to the base area structure 6 that it is preferably produced in the same way as the cover area structure 17, but in the desired shape for the base. Thus, with regard to its production, it differs only in the operational step of tailoring to the required size. The separating method employed for this purpose, however, is preferably the same as for the cover area structure 17.

The supporting parts 9 are likewise extruded in a strand and cut to the desired length.

Once the base 1 and the cover 10 have been formed by jointing their components, the supporting parts 9 are plugged onto the connecting elements 5 of the foot elements 2, such that they rise up perpendicularly from the base 1. The cover 10 is then laid onto the supporting parts 9 rising freely up, and tensed against the base 1 by means of tensing means fastened to the connecting elements 14. The base 1 is fitted with corresponding connecting counter elements for fastening the tensing means.

The container shown in Figure 2 differs from the container in Figure 1 in that, in addition to the supporting parts 9, it comprises closed side walls 20. Furthermore, the supporting parts 9 are only arranged in the corners of the container. The side walls 20 are formed in one piece by a side wall ring. The side wall ring can be folded, since each two of its side walls 20 are connected to each other in the corner regions, forming a folding joint. Two of the side walls 20, opposing each other, further comprise another folding joint in their center, such that the side wall ring as a whole can be folded flat together by means of an M-fold. The side walls 20 comprise notches on their lower

sides, the shape of said notches being adapted to bevels 8 of the base area structure 6 rising up, such that each one of the bevels 8 is accommodated flush in a respective notch and a smooth side wall 20 is thus obtained. In this way, the side walls 20 simultaneously also hold the base area structure 6 on the connecting pipes 4. Furthermore, the side walls 20 form a smooth transition to the jointing elements 13 and the bevels 19.

Figure 3 shows a container in accordance with a third example embodiment, which as opposed to the container in Figure 2 does not comprise supporting parts 9, but rather the one-piece side wall ring forming the side walls 20. Here, the side walls fully take on the function of supporting parts. The container in Figure 3 otherwise corresponds to the container in Figure 2.

Figure 4 shows the container of the third example embodiment, compacted. The side walls 20 are folded together and accommodated in a hollow space between the base 1 and the cover 10. The connecting elements 5 and/or the bevels 8 of the base 1 prevent the side walls 20 from slipping out between the base 1 and the cover 10. Due to its flat box shape, in particular due to its jointing elements 13, the cover 10 is positioned on the base 1 by overlapping the jointing elements 13 and the connecting elements 5. Here, too, the jointing elements 13 again form positioning elements of the cover 10. As applicable, the tensing means which ensure that the container components are held together when the container is assembled can be used to tie the compacted container. As a result, a particularly flat and thus space-saving container is created for tare transport and/or storage. In particular, a number of such compacted containers can be stacked one on top of the other to save space, wherein the base 1 resting on the cover 10 is secured against slipping off of the cover 10 by means of the feet 3 acting as positioning elements in the stack by surrounding the positioning elements 15 of the cover 10 on at least two sides, forming a corner region.

Figure 8 shows a minimal cover 10' formed from the edge parts 11 and a modified cover area structure 17' and a minimal base 1' formed by means of the foot elements 2. The edge parts 11 and the foot elements 2 correspond in their shape and size to the

edge parts 11 and foot elements 2 of the other example embodiments. The cover area structure 17' differs from the cover area structure 17 of the other example embodiments only in that it does not comprise the bevels 8 of the larger cover area structures 17. Rather, the edge elements 11 abut each other directly via their jointing elements 13. The foot elements 2 likewise abut each other directly. The foot elements 2 can be connected to each other in a material lock, for example by means of a welded connection. Alternatively or additionally, short connecting pipes 4 – connecting butts, so to speak – can be plugged into the receptacles of the foot elements 2. As the minimal base 1' and minimal cover 10' show, it is particularly advantageous if the length and width of the edge parts 11 each correspond to the length and width of the foot elements 2. In Figure 8, preferred length and width dimensions are given in millimeters by way of example.

In the foregoing description, preferred embodiments of the invention have been presented for the purpose of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise form disclosed. Obvious modifications or variations are possible in light of the above teachings. The embodiments were chosen and described to provide the best illustration of the principals of the invention and its practical application, and to enable one of ordinary skill in the art to utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. All such modifications and variations are within the scope of the invention as determined by the appended claims when interpreted in accordance with the breadth they are fairly, legally, and equitably entitled.